

U.S.S.N. 09/745,074

Page 2 of 10

Amendments To The Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

1. (Presently Amended) A vertical alignment mode liquid crystal display apparatus comprising:

a pair of substrates opposing each other;

a liquid crystal layer interposed between the pair of substrates, the liquid crystal layer containing liquid crystal molecules having a negative dielectric anisotropy; at least one electrode provided on each of the pair of substrates, the at least one electrode being used for applying an electric field across the liquid crystal layer; and

at least one volume excluding member,

wherein: one of the at least one volume excluding member is provided on the at least one electrode on at least one of the pair of substrates, the volume excluding member being provided so as to be on at least a portion of one side edge of the at least one electrode;

a side of each of the pair of substrates facing the liquid crystal layer is subjected to a vertical alignment treatment; and

the liquid crystal molecules are tilted in a uniform direction from the at least one side edge of the at least one electrode to an opposite edge when a voltage is applied to the at least one electrode.

2. (Original) A liquid crystal display apparatus according to claim 1, wherein the volume excluding member comprises at least one of a protrusion and a concave stepped portion.

U.S.S.N. 09/745,074

Page 3 of 10

3. (Withdrawn) A liquid crystal display apparatus according to claim 1, wherein the volume excluding member is provided along the entirety of the at least one side edge of the at least one electrode.

4. (Presently Amended) A vertical alignment mode liquid crystal display apparatus comprising:

a pair of substrates opposing each other;

a liquid crystal layer interposed between the pair of substrates, the liquid crystal layer containing liquid crystal molecules having a negative dielectric anisotropy; at least one electrode provided on each of the pair of substrates, the at least one electrode being used for applying an electric field across the liquid crystal layer; and

a plurality of volume excluding members provided on the at least one electrode on at least one of the pair of substrates, each of the plurality of volume excluding members being provided so as to be on at least a portion of each of an opposing pair of side edges of the at least one electrode but so as not to oppose each other, wherein:

a side of each of the pair of substrates facing the liquid crystal layer is subjected to a vertical alignment treatment; and

the liquid crystal molecules are tilted in a uniform direction from the at least one side edge of the at least one electrode to an opposite edge when a voltage is applied to the at least one electrode.

5. (Original) A liquid crystal display apparatus according to claim 4, wherein:

the at least one electrode on the at least one of the pair of substrates includes a first side edge and a second side edge; and

the plurality of volume excluding members are provided along a portion of the first side edge and along a portion of the second side edge.

U.S.S.N. 09/745,074
Page 4 of 10

6. (Original) A liquid crystal display apparatus according to claim 4, wherein a non-conductive window portion is formed in the at least one electrode on the at least one of the pair of substrates.

7. (Presently Amended) A vertical alignment mode liquid crystal display apparatus comprising:

a pair of substrates opposing each other;

a liquid crystal layer interposed between the pair of substrates, the liquid crystal layer containing liquid crystal molecules; and

at least one electrode provided on at least one of the pair of substrates, the at least one electrode being used for applying an electric field across the liquid crystal layer,

wherein:

the liquid crystal layer includes at least one pixel portion and a non-pixel portion, the at least one pixel portion corresponding to the at least one electrode; and when voltage is not applied to the at least one electrode, the liquid crystal molecules in the at least one pixel portion are oriented in a vertical alignment and the liquid crystal molecules in the non-pixel portion are oriented in a uniaxial horizontal alignment.

8. (Original) A liquid crystal display apparatus according to claim 7, wherein the liquid crystal molecules in the at least one pixel portion are oriented in a horizontal alignment so as to be tilted in a uniform direction when a voltage is applied to the at least one electrode.

9. (Original) A liquid crystal display apparatus according to claim 8, wherein a volume excluding member is formed on a portion of the at least one electrode.

10. (Original) A liquid crystal display apparatus according to claim 9, wherein the volume excluding member comprises at least one of a protrusion and a concave stepped portion.

U.S.S.N. 09/745,074

Page 5 of 10

11. (Original) A liquid crystal display apparatus according to claim 8, wherein a side of the at least one of the pair of substrates facing the liquid crystal layer is subjected to a rubbing treatment.
12. (Original) A liquid crystal display apparatus according to claim 8, wherein the at least one electrode comprise a comb electrode.
13. (Original) A liquid crystal display apparatus according to claim 7, wherein the liquid crystal molecules in the non-pixel portion are oriented in a uniaxial horizontal alignment by at least one method selected from the group consisting of : subjecting a horizontal alignment film to a rubbing treatment; subjecting a vertical alignment film to a selective chemical modification treatment followed by a rubbing treatment; subjecting a vertical alignment film to a selective irradiation of ultraviolet rays followed by a rubbing treatment; and subjecting a vertical alignment film to an irradiation of selectively polarized ultraviolet rays.
14. (Original) A liquid crystal display apparatus according to claim 8, wherein a direction of the horizontal alignment of the liquid crystal molecules in the at least one pixel portion is substantially identical to a direction of uniaxial horizontal alignment of the liquid crystal molecules in the non-pixel portion.